Robot-assisted delayed extraction of retained Lasso catheter combined with mitral valve repair and arrhythmia ablation

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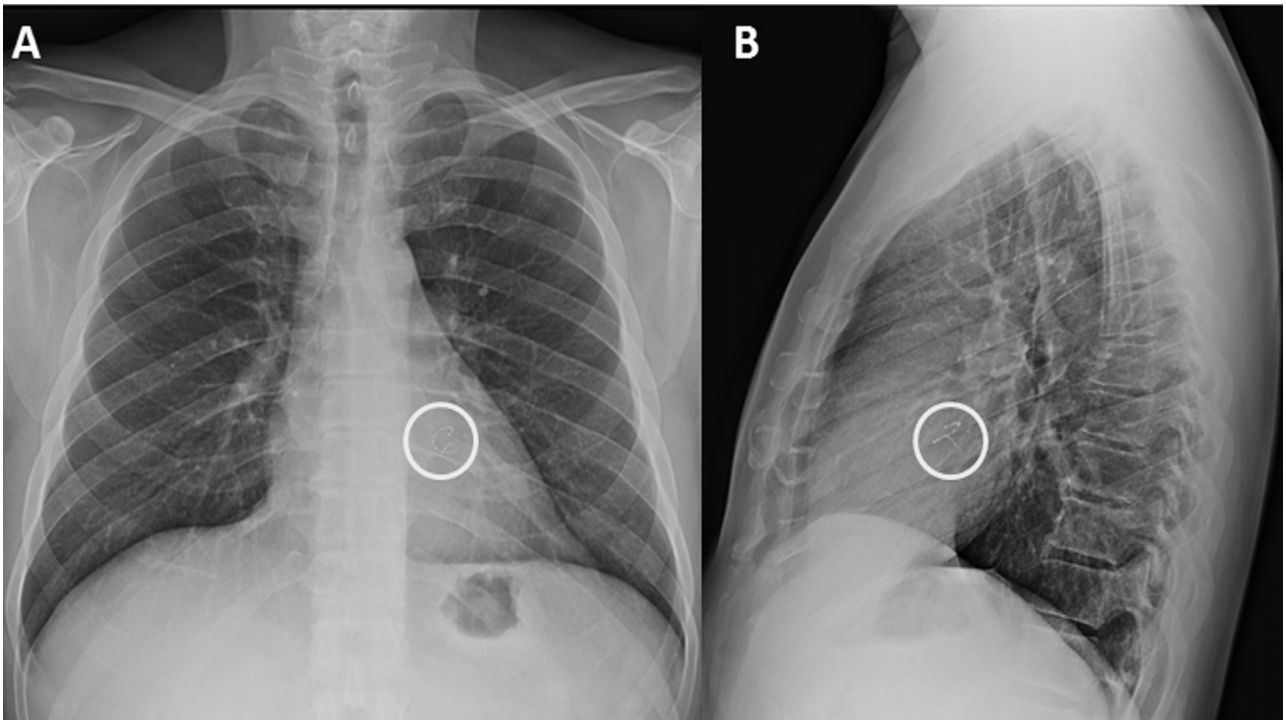

Figure 1 Plain chest radiograph **(A)** posteroanterior and **(B)** lateral views showing the retained fragment of the ablation catheter (*white circle*).

Introduction

Atrial fibrillation (AF) is a common rhythm disturbance that increases in prevalence with age. While pharmacologic agents are routinely utilized as first line therapy, catheter ablation of AF is often recommended when medications are unsuccessful or not appropriate. While infrequent entrapment of the circular catheter in the mitral apparatus has been reported, requiring emergent cardiac surgery via sternotomy.[1] We report delayed removal of the entrapped catheter along with mitral repair and completion of arrhythmia ablation using a minimally invasive robot-assisted approach.

Case report

A 53-year-old man underwent an ablation procedure for atrial fibrillation; however, the tip of the Lasso catheter (Biosense Webster, Inc, Diamond Bar, California) used for the ablation was entrapped in the mitral subvalvular apparatus (Figure 1A & B). Despite extensive efforts, the tip of the catheter broke and attempts at extraction were unsuccessful. The catheter tip was entrapped among the chordae of the mitral valve

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KEY TEACHING POINTS

- Transcatheter ablation procedures can cause mitral valve leaflet injury.
- Retained intracardiac foreign bodies can be extracted safely using minimally invasive robotic approaches.
- Robot-assisted approaches provide an excellent means of performing combined mitral valve repair and arrhythmia ablation.

(Figure 2A & B), resulting in a moderate degree of mitral regurgitation (Figure 3A). The catheter was also visualized on the computed tomography scan (Figure 3B).

Both traditional sternotomy and less invasive surgical options were considered; however, the patient selected robot-assisted (da Vinci surgical system, Intuitive Surgical Inc, Sunnyvale, California), minimally invasive and extraction of the entrapped fragment of the ablation catheter. During the 1-month time interval between ablation and robotic correction, the patient was anticoagulated owing to the presence of persistent atrial fibrillation. A 19F cannula was placed in the right common femoral artery in addition to 16F and 25F cannulae in the right internal jugular and femoral veins, respectively, using a modified Seldinger technique and echocardiographic guidance. The following right thoracic ports were placed: working port and left and right robotic arm ports, camera port, and left atrial retractor port. Following dissection of pericardial adhesions, groin cannulation, support on cardiopulmonary bypass and antegrade

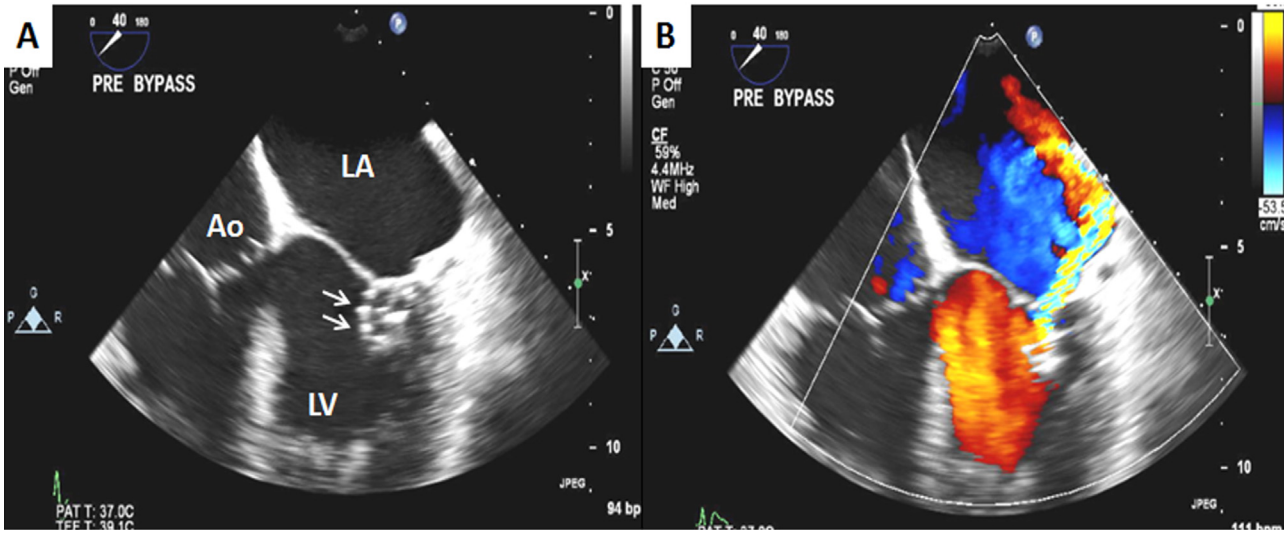

Figure 2 Transesophageal echocardiography showing **(A)** the retained fragment of the ablation catheter (*white arrows*) that was entrapped in the chordae near the anterolateral commissure of the mitral valve and **(B)** the resultant moderate mitral regurgitation.

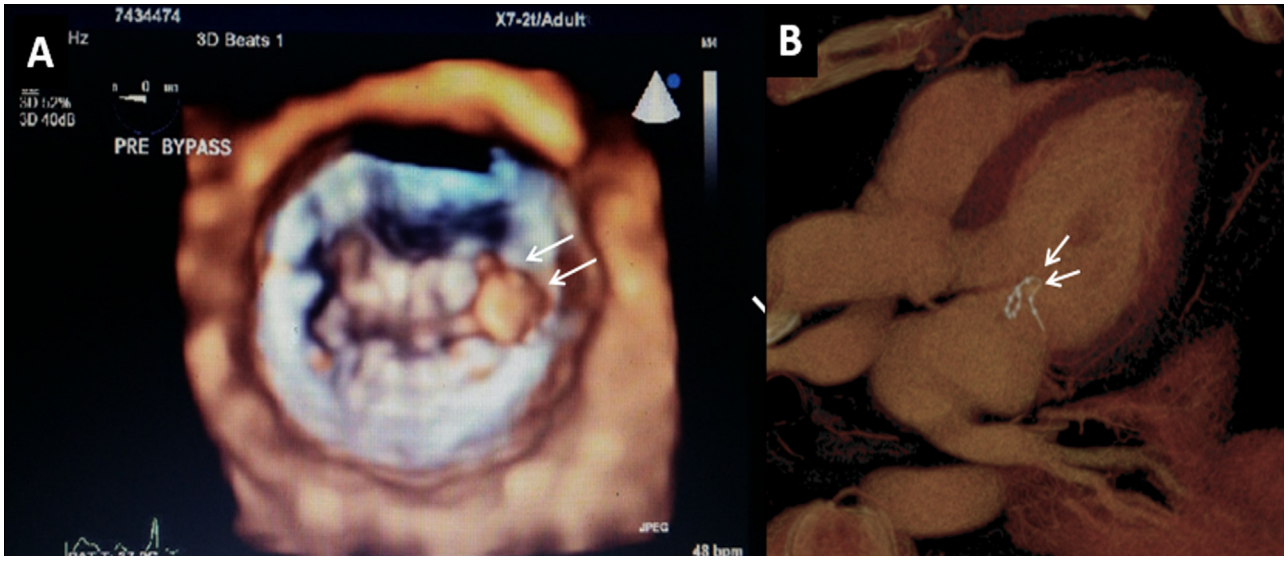

Figure 3 **(A)** A 3-D left ventricular image from prebypass transesophageal echocardiography showing the entrapped catheter (*white arrows*). **(B)** Computed tomography scan of the chest showing the retained catheter (*white arrows*).

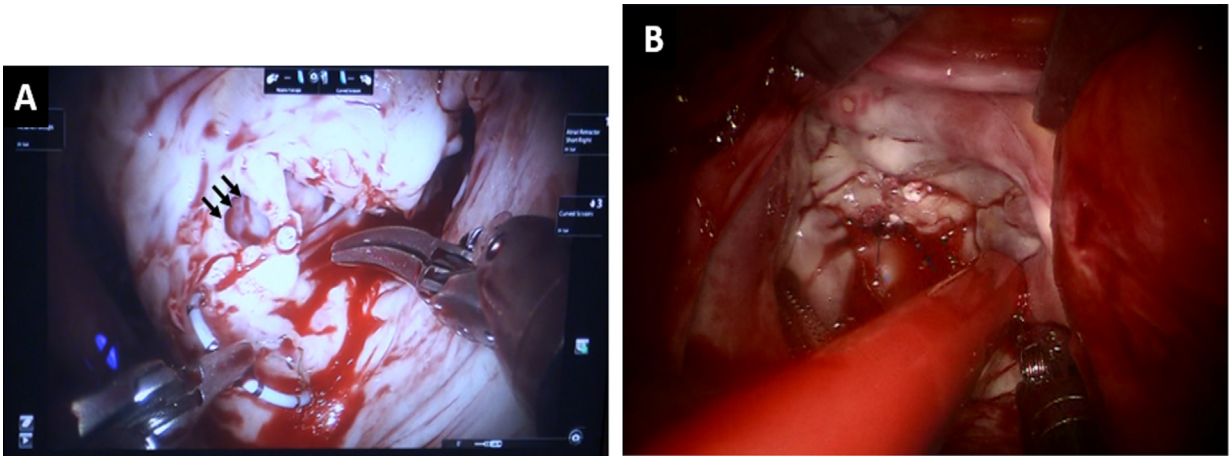

Figure 4 Intraoperative photographs showing **(A)** the perforation in the anterior mitral leaflet (*black arrows*) as a result of the ablation and, in the left robotic arm, the catheter fragment. **(B)** Saline test showing competent mitral valve with good coaptation of the leaflets.

cardioplegia arrest of the heart through a standard left atrial approach, the entrapped catheter was easily visualized and was removed using sharp dissection (Figure 4A). The resultant leaflet defect was repaired using multiple interrupted pledgeted polypropylene sutures (Figure 4B). Pulmonary vein isolation using cryoablation (Medtronic, Minneapolis, Minnesota) and exclusion of the left atrial appendage were also performed. The ablation lesion sets served to isolate the pulmonary venous cuff in addition to 2 ablation lines, 1 extended from the pulmonary venous cuff to the posterior mitral annulus and another to the base of the left atrial appendage. Cardiopulmonary bypass and aortic cross-clamp times were 90 and 51 minutes, respectively.

The patient had an uneventful postoperative course. Dismissal echocardiography confirmed mitral valve competence. The patient was in sinus rhythm at dismissal and during follow-up.

Reference

1. Weymann A, Schmack B, Rauch H, Rosendal C, Karck M, Szabó G. Entanglement of a circular mapping catheter in the mitral valve with persistent iatrogenic atrial septal defect after attempted pulmonary vein isolation: a word of caution. Ann Thorac Cardiovasc Surg 2014;20(3):250–252. Epub 2012 Dec 26.